Mast heel location for rake and pre-bend of keel-stepped mast

A supplement to Hints and Advice

A keel-stepped mast must have an even curvature (convex forward) right down to the mast heel.
This means that the mast heel must be located aft of a line from the forestay attachment on the mast through the centre of the deck ring (dashed line). Before the mast is raised, it is difficult to decide precisely where the mast heel should be located. Start from the guide position as described below. The location of the mast heel can usually be adjusted after the mast has been stepped.

The best method to check that the mast has an even curvature is to view the mast from the masthead and down to deck level.

To calculate the location of the mast heel you need to know the mast rake and the desired pre-bend of the mast.
1. Find your requested rake in table 1, note the factor x.
2. Find your requested pre-bend in table 2. note the factor y.
3. To calculate the distance ''a'' for the mast heel use the following formula: $a = (x - y) \cdot Q$
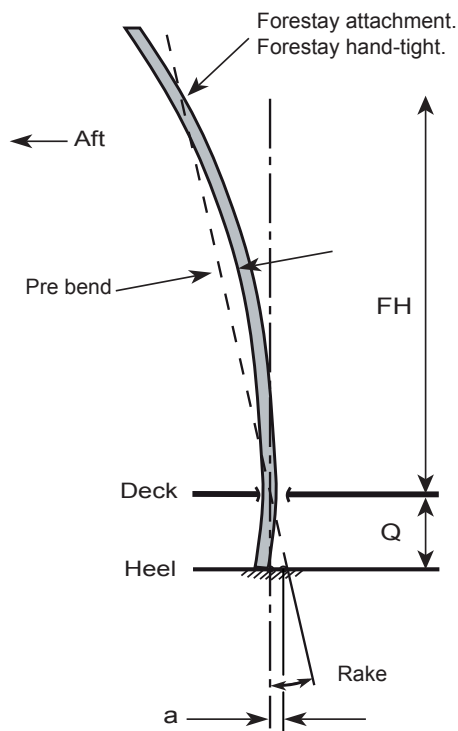
Rake	Factor
[°]	x
0.0	0.000
0.2	0.003
0.4	0.007
0.6	0.010
0.8	0.014
1.0	0.017
1.2	0.020
1.4	0.024
1.6	0.027
1.8	0.031
2.0	0.034
2.2	0.037
2.4	0.041
2.6	0.044
2.8	0.048
3.0	0.051

Table 1

Prebend	Factor
[% of FH]	y
0.0	0.000
0.1	0.003
0.2	0.007
0.3	0.010
0.4	0.014
0.5	0.017
0.6	0.020
0.7	0.024
0.8	0.027
0.9	0.031
1.0	0.034
1.1	0.037
1.2	0.041
1.3	0.044
1.4	0.048
1.5	0.051

Table 2

FH: Forestay height
Q: Bury
(If P, mainsail luff space, is simiular to FH, pre-bend can be measured along P).

Examples
1. Rake=1°, Pre-bend=0.5%, Q=1900 mm, A = (0.017-0.017) x 1900mm = 0mm,
    I.e. the centre of the mast at mast heel to be located at the vertical line from the centre of the mast at deck-ring level.
2. Rake=1.6°, Pre-bend=0.4%, Q=1900 mm, A = (0.027-0.014) x 1900mm = 24.7mm,
    I.e. the centre of the mast at mast heel to be located 25 mm forward of the vertical line from the centre of the mast at deck ring level.